

Claims

- [c1] 1.A conductive thermoplastic composition comprising:
about 20 to about 60 weight percent of a polyphenylene ether copolymer
comprising about 75 to about 90 weight percent of 2,6-dimethyl-1,4-
phenylene ether units and about 10 to about 25 weight percent of 2,3,6-
trimethyl-1,4-phenylene ether units;
about 30 to about 65 weight percent of a polyamide; and
about 0.025 to about 40 weight percent of an electrically conductive filler;
wherein all weight percents are based on the total weight of the composition.
- [c2] 2.The composition of Claim 1, wherein the polyphenylene ether copolymer has
an intrinsic viscosity of about 0.20 to about 2.0 dL/g as measured in chloroform
at 25 ° C.
- [c3] 3.The composition of Claim 1, wherein the polyamide comprises nylon 6, nylon
6,6, or a combination thereof.
- [c4] 4.The composition of Claim 1, wherein the polyamide comprises nylon 6 and
nylon 6,6.
- [c5] 5.The composition of Claim 1, wherein the polyamide comprises about 3 to
about 17 weight percent of nylon 6 and about 25 to about 51 weight percent of
nylon 6,6.
- [c6] 6.The composition of Claim 1, wherein the electrically conductive filler is
selected from the group consisting of carbon fibers, vapor grown carbon fibers,
carbon nanotubes, carbon black, conductive metal fillers, conductive non-metal
fillers, metal-coated fillers, and combinations comprising at least one of the
foregoing electrically conductive fillers.
- [c7] 7.The composition of Claim 1, wherein the electrically conductive filler
comprises about 2 weight percent to about 40 weight percent of carbon fibers.
- [c8] 8.The composition of Claim 1, wherein the electrically conductive filler
comprises about 0.05 weight percent to about 10 weight percent of vapor
grown carbon fibers.

- [c9] 9.The composition of Claim 1, wherein the electrically conductive filler comprises about 0.025 weight percent to about 10 weight percent of carbon nanotubes.
- [c10] 10.The composition of Claim 1, wherein the electrically conductive filler comprises about 0.5 weight percent to about 25 weight percent of carbon black.
- [c11] 11.The composition of Claim 1, wherein the electrically conductive filler comprises about 1 weight percent to about 40 weight percent of a conductive metal filler.
- [c12] 12.The composition of Claim 1, wherein the electrically conductive filler comprises about 1 weight percent to about 40 weight percent of a conductive non-metal filler.
- [c13] 13.The composition of Claim 1, wherein the electrically conductive filler comprises about 1 weight percent to about 40 weight percent of a metal-coated filler.
- [c14] 14.The composition of Claim 1, further comprising about 1 to about 30 weight percent of an impact modifier selected from the group consisting of styrene-butadiene diblock copolymers, styrene-(ethylene-propylene) diblock copolymers, styrene-isoprene diblock copolymers, alpha-methylstyrene-butadiene diblock copolymers, styrene-butadiene-styrene triblock copolymers, styrene-(ethylene-butylene)-styrene triblock copolymers, styrene-isoprene-styrene triblock copolymers, alpha-methylstyrene-butadiene-alpha-methylstyrene triblock copolymers, and combinations comprising at least one of the foregoing impact modifiers.
- [c15] 15.The composition of Claim 1, further comprising about 2 to about 26 weight percent of an impact modifier selected from the group consisting styrene-(ethylene-butylene)-styrene triblock copolymers, styrene-(ethylene-propylene) diblock copolymers, and combinations comprising at least one of the foregoing impact modifiers.
- [c16] 16.The composition of Claim 1, further comprising about 0.1 to about 5 weight

percent of a compatibilizing agent.

- [c17] 17.The composition of Claim 16, wherein the compatibilizing agent is selected from the group consisting of citric acid, malic acid, maleic acid, maleic anhydride, fumaric acid, and combinations comprising at least one of the foregoing compatibilizing agents.
- [c18] 18.The composition of Claim 1, further comprising about 0.05 to 1 weight percent of pentaerythritol tetrakis(3-laurylthiopropionate).
- [c19] 19.The composition of Claim 1, further comprising at least one additive selected from the group consisting of stabilizers, antioxidants, antiozonants, mold release agents, dyes, pigments, UV stabilizers, non-conductive fillers, viscosity modifiers, and combinations comprising at least one of the foregoing additives.
- [c20] 20.The composition of Claim 1, wherein the composition after molding exhibits a specific volume resistivity up to about 10^5 ohm-cm.
- [c21] 21.A conductive composition comprising:
about 30 to about 45 weight percent of a polyphenylene ether copolymer comprising about 75 to about 90 weight percent of 2,6-dimethyl-1,4-phenylene ether units and about 10 to about 25 weight percent of 2,3,6-trimethyl-1,4-phenylene ether units;
about 30 to 65 weight percent of a polyamide selected from the group consisting of nylon 6,6, nylon 6, and mixtures thereof;
about 5 to about 20 weight percent of an impact modifier;
about 0.5 to about 5 weight percent of an electrically conductive filler selected from the group comprising a conductive carbon black, vapor grown carbon fibers, and mixtures thereof; and
about 0.1 to about 5 weight percent a compatibilizing agent selected from the group consisting of citric acid, maleic acid, maleic anhydride, malic acid, fumaric acid, and combinations comprising at least one of the foregoing compatibilizing agents;
wherein all weight percents are based on the total weight of the composition.
- [c22] 22.The composition of Claim 21, wherein the impact modifier comprises a

styrene-(ethylene-butylene)-styrene triblock copolymer and a styrene-(ethylene-propylene) diblock copolymer.

- [c23] 23.The composition of Claim 21, wherein the electrically conductive filler is added to the composition as a masterbatch in the polyamide.
- [c24] 24.The composition of Claim 21, comprising about 5 to about 15 weight percent of the nylon 6 and about 25 to about 50 weight percent of the nylon 6,6.
- [c25] 25.A conductive composition comprising:
about 32 to about 38 weight percent of a polyphenylene ether copolymer comprising about 75 to about 90 weight percent of 2,6-dimethyl-1,4-phenylene ether units and about 10 to about 25 weight percent of 2,3,6-trimethyl-1,4-phenylene ether units;
about 35 to about 40 weight percent of nylon 6,6;
about 8 to about 12 weight percent of nylon 6;
about 5 to about 10 weight percent of a styrene-(ethylene-butadiene)-styrene triblock copolymer;
about 5 to about 10 weight percent of a styrene-(ethylene-propylene) diblock copolymer;
about 1.0 to about 2.5 weight percent of a conductive carbon black; and
about 0.3 to about 1.1 weight percent of citric acid;
wherein all weight percents are based on the total weight of the composition.
- [c26] 26.A conductive thermoplastic composition comprising the reaction product of:
about 20 to about 60 weight percent of a polyphenylene ether copolymer comprising about 75 to about 90 weight percent of 2,6-dimethyl-1,4-phenylene ether units and about 10 to about 25 weight percent of 2,3,6-trimethyl-1,4-phenylene ether units;
about 30 to about 65 weight percent of a polyamide; and
about 0.025 to about 40 weight percent of an electrically conductive filler;
wherein all weight percents are based on the total weight of the composition.
- [c27] 27.An article comprising the composition of Claim 26.

- [c28] 28. An automobile exterior panel comprising the composition of Claim 26.
- [c29] 29. A pellet comprising the composition of Claim 26.
- [c30] 30. A method for preparing a conductive thermoplastic composition, comprising:
melt blending about 20 to about 60 weight percent of a polyphenylene ether copolymer comprising about 75 to about 90 weight percent of 2,6-dimethyl-1,4-phenylene ether units and about 10 to about 25 weight percent of 2,3,6-trimethyl-1,4-phenylene ether units, about 30 to about 65 weight percent of a polyamide, and about 0.025 to about 40 weight percent of an electrically conductive filler, wherein all weight percents are based on the total weight of the composition.

US 2014/010704